

a fluid outlet sink for removing fluid from said channel(s); and

b) a reader device, the reader device comprising:

a receiving port for introducing the cartridge into the reader;

means for delivering air to the fluid input port of the cartridge once inserted within the reader, so that air can be transported through the microfluidic channel(s) of the cartridge;

a magnet or means for generating a magnetic field, such as that upon application of the magnetic field or moving the magnet of the reader into close proximity with the binding agent with the cartridge, the binding agent is held in place by the magnetic field or magnet; and

detection means for enabling detection of the analyte or a reaction product formed as a result of the analyte binding the binding agent within the cartridge.

**46.** The assay system according to claim **45** wherein the reader device comprises one or more sealing means which are adapted to co-locate with each of said input ports of the cartridge in order to form a fluid-tight seal with the cartridge once correctly inserted into the reader.

**47.** The assay system according to either of claim **45**, wherein the reader comprises one or more pumps for delivering the air into and throughout the cartridge.

**48.** The assay device according to claim **45** wherein the reader comprises a fluid management system which is capable of controlling fluid delivery to the cartridge.

**49.** The assay system according to claim **45**, wherein the binding agent is in the form of magnetic or paramagnetic particles which comprise a binding moiety on their surface, designed to specifically bind a desired analyte.

**50.** The assay system according to claim **49**, wherein the binding moiety is an antibody, protein, peptide or oligonucleotide

**51.** The assay system according to claim **45**, wherein the detection means is a fluorescent measurement.

**52.** A microfluidic assay cartridge for use in the assay system according to claim **45**, the cartridge comprising:

a substrate comprising one or more microfluidic channels disposed therein and comprising a binding agent disposed within said channel(s) for binding any of said analyte within the sample the binding agent comprising magnetic properties;

a sample port for introducing said fluid sample into the cartridge;

a fluid outlet sink for removing fluid from said channel(s); and

at least one fluid input port for allowing air to be introduced to the cartridge from the associated reader device and transported through the microfluidic channel(s).

**53.** The microfluidic assay cartridge according to claim **52** further comprising a detection area where any bound analyte may be detected, wherein the detection area is preferably immediately downstream of the sample port, and within the test sample channel.

**54.** The microfluidic assay cartridge according to claim **52**, wherein the cartridge and the channels and other features disposed therein, are formed by a sandwich of three separate substrates—a top, middle and bottom substrate.

**55.** The microfluidic cartridge according to claim **54**, wherein the top face comprises said at least one fluid input port for introducing air from the reader into said microfluidic channel(s).

**56.** The microfluidic cartridge according to claim **52**, wherein the sample port is formed in said wall disposed between said top and bottom surfaces.

**57.** The microfluidic assay cartridge according to claim **52** wherein said input port(s) of the cartridge is/are adapted to co-locate with sealing means in the reader, so that air, can be introduced into the cartridge, from the reader.

**58.** The microfluidic assay cartridge according to claim **52** further comprising one or more fluid stop features, which are designed to prevent the sample and/or other fluids from passing through the stop feature, by virtue of capillary action alone.

**59.** The microfluidic assay cartridge according to claim **52** further comprising one or more electrode features which contact with the channel, for conducting an electrical measurement on the fluid sample.

**60.** The microfluidic assay cartridge according to claim **52** wherein the binding agent is attached directly to a wall or surface of said channel within the cartridge, or to the surface of a magnetic agent, such as a magnetic or paramagnetic particle disposed within said channel.

**61.** The microfluidic assay cartridge according to claim **52** further comprising one or more reagents, such a label deposited within said microfluidic channels(s), which reagents may facilitate detection of the captured analyte.

**62.** A reader device for use in the assay system according to claim **45**, the reader device comprising:

a receiving port for introducing the cartridge into the reader;

means for delivering air to the fluid input port of the cartridge once inserted within the reader, so that air can be transported through the microfluidic channel(s) of the cartridge;

a magnet or means for generating a magnetic field, such as that upon application of the magnetic field or moving the magnet of the reader into close proximity with the binding agent with the cartridge, the binding agent is held in place by the magnetic field or magnet; and

detection means for enabling detection of the analyte or a reaction product formed as a result of the analyte binding the binding agent within the cartridge

**63.** The reader according to claim **62**, wherein the means for delivering the fluid to the fluid input port of the cartridge, is a pump.

**64.** The reader according to claim **45**, further comprising fluid management means for controlling the delivery of fluid to the cartridge.

**65.** The reader according to claim **45**, further comprising one or more sealing means for co-locating with said one or more respective fluid input ports of the cartridge, so as to form a fluid seal with said one or more respective fluid input ports of the cartridge.

**66.** A method of conducting an assay on a sample, the method comprising:

introducing, by way of capillary action, a fluid sample into a microfluidic cartridge according to claim **52** such that the fluid is drawn through the cartridge and comes into contact with said binding agent, whereby at least a portion of said analyte present in the sample is bound by the magnetic or paramagnetic binding agent;

washing any unbound material away from the bound analyte using air transported within the cartridge by the